

University of Illinois Department of Agricultural and Biological Engineering
 Bioenvironmental and Structural Systems Lab
 Final Report

Project Number: 20086
 Test Date: January 27, 2020

Fan:		Motor:		Shutter:	Butterfly damper
Make- <i>Chore-Time</i>		Make- <i>Lafert</i>		Material- <i>Poly</i>	
Model- <i>56555-2</i>		Model- <i>HPS 90 630 70</i>		# Doors- <i>2</i>	
Blade dia.- <i>56.8"</i>		Hp- <i>2.06 kW</i>		# Columns- <i>-</i>	
Orifice dia.- <i>57.3"</i>		RPM- <i>630</i>		Door length -	
		Volts- <i>230</i>		Location- <i>exhaust</i>	
Blade:		Amps- <i>7</i>			
Number- <i>3</i>		Hz- <i>-</i>		Guards:	
Shape- <i>propeller</i>		Phase- <i>3</i>		Description- <i>wire</i>	
Material- <i>galvanized steel</i>		S. F.- <i>-</i>		Spacing- <i>1.3" x 2" / 5.5" concentric</i>	
Pitch- <i>-</i>				Location- <i>intake / exhaust</i>	
Clearance- <i>0.2"</i>		Housing:			
		Material- <i>Poly</i>		Discharge Cone:	
Drive Sheaves:		Intake area- <i>57.5" x 57.5"</i>		Depth- <i>34.8"</i>	
Drive dia.- <i>direct</i>		Discharge- <i>56.6"</i>		Minor dia.- <i>56.6"</i>	
Axle dia.- <i>drive</i>		Depth- <i>10.5" + 6.5" wood fra</i>		Major dia.- <i>70"</i>	

Notes: speed control: Invertek Optidrive E3 ODE-3-120070-301A. Fan sub-assembly part no. 56555-1P.
 *50Hz, Three phase 230VAC input to drive

Test Conditions:

T(wb): 55	Barometric pressure, recorded	29.31
T(db): 77	Barometric Pressure, corrected	29.18

Static Pressure (in.H2O)	Airflow (cfm)	rpm	Volts	Amps	Watts	cfm/Watt	SI Units			
							Static Pressure (Pa)	Airflow (m ³ /hr.)	(m ³ /hr)/W	W/1000m ³ /hr
42 Hz										
0.00	34800	631	231.1	3.67	1383	25.2	0	59200	42.8	23
0.05	33500	631	231.3	3.96	1493	22.4	12	56900	38.1	26
0.10	31800	631	231.4	4.28	1605	19.8	25	54100	33.7	30
0.15	30500	632	231.5	4.51	1701	17.9	37	51700	30.4	33
0.20	28700	632	230.2	4.81	1816	15.8	50	48900	26.9	37
0.25	26900	632	230.3	5.11	1914	14.1	62	45700	23.9	42
0.30	25000	632	230.4	5.38	2015	12.4	75	42500	21.1	47
38.2 Hz										
0.00	32100	576	230.2	2.87	1063	30.2	0	54600	51.3	19
0.05	30500	576	230.3	3.10	1169	26.1	12	51900	44.4	23
0.10	28700	576	230.4	3.40	1272	22.6	25	48900	38.4	26
0.15	27000	576	230.5	3.63	1355	19.9	37	45900	33.9	30
0.20	24900	576	230.6	3.87	1455	17.1	50	42300	29.1	34
0.25	22600	576	230.7	4.08	1545	14.6	62	38400	24.9	40
33.2 Hz										
0.00	28200	501	230.2	1.97	727	38.8	0	47900	65.9	15
0.05	26400	501	230.3	2.17	805	32.7	12	44800	55.6	18
0.10	24200	501	230.4	2.41	894	27.1	25	41100	46	22
0.15	21900	500	230.4	2.60	967	22.6	37	37200	38.5	26
0.20	19300	500	230.5	2.77	1040	18.5	50	32800	31.5	32
0.25	14600	500	230.5	2.88	1076	13.6	62	24900	23.1	43
28.2 Hz										
0.00	24200	425	230.0	1.29	468	51.7	0	41100	87.9	11
0.05	20400	425	230.2	1.50	542	37.7	12	34700	64	16
0.10	18300	425	230.2	1.68	608	30.0	25	31000	51	20
0.15	14600	425	230.2	1.79	653	22.3	37	24800	37.9	26
0.20	9600	425	230.3	1.88	694	13.9	50	16400	23.6	42
23.2 Hz										
0.00	19300	350	229.9	0.83	279	69.1	0	32700	117.3	9
0.05	16000	350	230.0	0.99	336	47.6	12	27200	81	12
0.10	11500	350	230.1	1.07	372	31.0	25	19600	52.7	19
0.15	6400	350	230.1	1.20	410	15.7	37	10900	26.6	38